

3
Please substitute the paragraph beginning at page 5, line 17, with the following. A

marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The chamber desirably incorporates at least some of the optical elements of a projection optical unit. --

Please substitute the paragraph beginning at page 6, line 24, with the following. A

marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The chamber desirably incorporates at least some of the optical elements of an illumination optical unit. --

4
Please substitute the paragraph beginning at page 6, line 26, with the following. A

marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The chamber desirably incorporates at least some of the optical elements of a projection optical unit. --

Please substitute the paragraph beginning at page 7, line 26, with the following. A

marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

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-- The chamber desirably incorporates at least some of the optical elements of an illumination optical unit. --

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m
Please substitute the paragraph beginning at page 8, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The chamber desirably incorporates at least some of the optical elements of a projection optical unit. --

Please substitute the paragraph beginning at page 17, line 21, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

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X
-- A load-lock chamber 36 is used in loading/unloading the wafer 14, and comprises gate valves 37 and 38 freely opened/closed by a driving unit (not shown). A support table 39 is provided for the wafer 14. A wafer transfer robot 40 supplies/recovers a wafer to/from the wafer chuck 16. --

Please substitute the paragraph beginning at page 18, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

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X
-- A gas supply source 51 supplies nitrogen gas or helium gas as an inert gas. The two gases exhibit high transmittances with respect to an F_2 laser beam. The gas supply source 51 supplies gas hardly containing oxygen. "Gas hardly containing oxygen" means that the gas does not contain a given amount of oxygen, which greatly influences the performance of the apparatus, and means at least a lower oxygen concentration than an oxygen concentration required for the chamber 4 or the like. --

Please substitute the paragraph beginning at page 22, line 22, and ending on page 23, line 7, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- In the first embodiment, the gas supply port 59 is formed in one end of the housing 6 on the light source side, and the gas discharge port 60 is formed in one end of the housing 6 on the reticle side. However, the ports 59 and 60 are not limited to this. For example, it may also be possible that the gas supply port is formed in one end of the housing 6 on the reticle side and the gas discharge port is formed in one end of the housing 6 on the light source side. In some cases, a port having the masking blade serving as a movable displacement adjusting member is desirably set at a downstream side in consideration of the gas purity of the atmosphere in the housing 6. --

Please substitute the paragraph beginning at page 24, line 14, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- A vent hole 105A communicates with the atmospheres in the chamber 4 and closed vessel. When the vacuum pump 103 forcibly discharges gas from the closed vessel 101, the interior of the closed vessel 101 changes to a reduced-pressure atmosphere, and gas in the chamber 4 is discharged to the closed vessel 101 via the vent hole 105A. At the same time as the interior of the chamber 4 is evacuated, the internal pressures of the chamber 4 and closed vessel can be set to be almost equal. --

Please substitute the paragraph beginning at page 24, line 24, and ending on page 25, line 6, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- A vent hole 105B communicates with the atmospheres in the housing 6 and closed vessel. When the vacuum pump 103 forcibly discharges gas from the closed vessel 101, the interior of the closed vessel 101 changes to a reduced-pressure atmosphere, and gas in the housing 6 is discharged to the closed vessel 101 via the vent hole 105B. At the same time as the interior of the housing 6 is evacuated, the internal pressures of the housing 6 and closed vessel can be set to be almost equal. --

Please substitute the paragraph beginning at page 26, line 16, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The displacement mechanisms are illustrated in only the chamber 4 in Fig. 3, but are similarly arranged in the housing 6. --

Please substitute the paragraph beginning at page 30, line 12, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- A pattern drawn on the reticle 8 is reduced and projected onto the wafer 14 via lenses 402, 405, 408, 411, 414, 417, and 420. Reference numeral 401 denotes a lens barrel of these lenses. --

Please substitute the paragraph beginning at page 33, line 5, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

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X -- A vent hole 155 communicates with the atmospheres in the projection optical unit 13 and closed vessel 151. When the vacuum pump 153 forcibly discharges gas from the projection optical unit 13, the interior of the projection optical unit 13 changes to a reduced-pressure atmosphere, and gas in the closed vessel 151 is discharged to the projection optical unit 13 via the vent hole 155. At the same time as the interiors of the projection optical unit 13 and closed vessel 151 are evacuated, the internal pressures of the projection optical unit 13 and closed vessel 151 can be set to be almost equal. --

Please substitute the paragraph beginning at page 38, line 14, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

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X -- A vacuum pump 153A evacuates the space between the closed vessels 151A and 151B and the projection optical unit 13, whereas a vacuum pump 153B exhausts gas from the projection optical unit 13. Similar to the above-described case, the internal pressures of the projection optical unit 13 and closed vessel 151 are set to be almost equal. Also, similar to the above-described case, it may be possible to form vent holes and attach a vacuum pump to either hole. --

Please substitute the paragraph beginning at page 38, line 23, and ending on page 39, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Evacuation of the closed vessels 151A and 151B may generate the internal/external pressure differences of the closed vessel 151A and 151B and may deform them. It is not preferable that deformation of the closed vessels 151A and 151B influence the projection optical unit 13. --

Please substitute the paragraph beginning at page 41, line 18, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Although not shown, the gas circulation unit 72 comprises a chemical filter for removing an impurity in the gas from the inlet port. --

Please substitute the paragraph beginning at page 43, line 11, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- This arrangement can always control the internal pressure of the chamber 26 to be constant. Accordingly, optical characteristics readily influenced by variations in pressure, e.g., the performance of the projection optical unit 13 (Fig. 1) can be maintained. --

Please substitute the paragraph beginning at page 44, line 12, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Gas is supplied at a timing when the gate valves 32 and 37 are opened, a reticle and wafer are placed on the support tables 34 and 39, the gate valves 32 and 37 are closed, and the valve (not shown) of the gas supply source and the valve (not shown) of the discharge mechanism 86 are opened in accordance with an instruction from the controller 78. --

Please substitute the paragraph beginning at page 45, line 27, and ending on page 46, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- A discharge port 87 is provided for discharging gas from the chamber 26. --

Please substitute the paragraph beginning at page 47, line 17, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The embodiment of Fig. 1 uses the movable displacement adjusting members 27, 28, and 29, which can prevent direct influence of deformation of an adjacent building component even if the chambers 4 and 26 deform in a vacuum. --

Please substitute the paragraph beginning at page 47, line 22, and ending on page 48, line 6, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- A series of gas supply operations after evacuating the interiors of the chambers and load-lock chambers may be repeated a plurality of number of times, as needed. When evacuation

is repeated a plurality of number of times, the ultimate degree of vacuum in the chambers and load-lock chambers suffices to be relatively lower (higher absolute pressure) than that in only one evacuation. This can greatly reduce the costs of vacuum pumps and vacuum components. According to the replacement method of the present invention, it is desirable to introduce helium after the end of the last evacuation and to use nitrogen for a preceding purge. --

Please substitute the paragraph beginning at page 51, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- In the second embodiment, the chamber 4 and housing 6 which constitute the illumination optical unit are supported by the illumination unit surface plate 1022 (Fig. 14). The illumination unit surface plate 1022 may be integrated with the lens barrel surface 22 (refer to Fig. 7, in the first embodiment), which holds the projection optical unit 13. --

Please substitute the paragraph beginning at page 51, line 11, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Moreover, in the second embodiment, the closed vessel 101 (Fig. 14) may be formed with the same constitution of the closed vessel 151A and 151B (refer to Fig. 7, in the first embodiment). --

Please substitute the paragraph beginning at page 51, line 15, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

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Please substitute the paragraph beginning at page 52, line 7, and ending on page 53, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 9 shows the overall system cut out at a given angle. In Fig. 9, reference numeral 1101 denotes a business office of a vendor (apparatus supply manufacturer) which provides a

semiconductor device manufacturing apparatus. Assumed examples of the manufacturing apparatus are semiconductor manufacturing apparatuses for performing various processes used in a semiconductor manufacturing factory, (e.g., a lithography apparatus including an exposure apparatus, a resist processing apparatus, and an etching apparatus, an annealing apparatus, a film formation apparatus, a planarization apparatus, and the like) and post-process apparatuses (e.g., an assembly apparatus, an inspection apparatus, and the like). The business office 1101 comprises a host management system 1108 for providing a maintenance database for the manufacturing apparatus, a plurality of operation terminal computes 1110, and a LAN (Local Area Network) 1109 which connects the host management system 1108 and computers 1110 to construct an intranet. The host management system 1108 has a gateway for connecting the LAN 1109 to Internet 1105 as an external network of the business office, and a security function for limiting external accesses. --

Please substitute the paragraph beginning at page 55, line 9, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- In Fig. 10, reference numeral 1201 denotes a manufacturing factory of a manufacturing apparatus user (semiconductor device manufacturer) where manufacturing apparatuses for performing various processes, e.g., an exposure apparatus 1202, a resist processing apparatus 1203, and a film formation apparatus 1204 are installed in the manufacturing line of the factory. Fig. 10 shows only one manufacturing factory 1201, but a plurality of factories are networked in practice. --

Please substitute the paragraph beginning at page 56, line 3, with the following. A

marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

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-- The host management system 1205 for managing the apparatuses in the manufacturing factory of the user, and the management systems 1211, 1221, and 1231 of the vendors for the respective apparatuses are connected via the Internet or dedicated-line network serving as an external network 1200. If trouble occurs in any one of a series of manufacturing apparatuses along the manufacturing line in this system, the operation of the manufacturing line stops. This trouble can be quickly solved by remote maintenance from the vendor of the apparatus in trouble via the Internet 1200. This can minimize the stoppage of the manufacturing line. --

Please substitute the paragraph beginning at page 57, line 23, and ending on page 58, line 24, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

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-- A semiconductor device manufacturing process using the above-described production system will be explained. Fig. 12 shows the flow of the whole manufacturing process of the semiconductor device. In step 1 (circuit design), a semiconductor device circuit is designed. In step 2 (creation of exposure control data), exposure control data of the exposure apparatus is created based on the designed circuit pattern. In step 3 (wafer manufacture), a wafer is manufactured using a material such as silicon. In step 4 (wafer process) called a pre-process, an actual circuit is formed on the wafer by lithography using a prepared mask and the wafer. Step 5 (assembly) called a post-process is the step of forming a semiconductor chip by using the wafer

manufactured in step 4, and includes an assembly process (dicing and bonding) and packaging process (chip encapsulation). In step 6 (inspection), inspections such as an operation confirmation test and a durability test of the semiconductor device manufactured in step 5 are conducted. After these steps, the semiconductor device is completed and shipped (step 7). The pre-process and post-process are performed in separate dedicated factories, and maintenance is done for each of the factories by the above-described remote maintenance system. Information for production management and apparatus maintenance is communicated between the pre-process factory and the post-process factory via the Internet or dedicated-line network. --

Please substitute the paragraph beginning at page 58, line 25, and ending on page 59, line 20, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 13 shows the detailed flow of the wafer process. In step 11 (oxidation), the wafer surface is oxidized. In step 12 (CVD), an insulating film is formed on the wafer surface. In step 13 (electrode formation), an electrode is formed on the wafer by vapor deposition. In step 14 (ion implantation), ions are implanted in the wafer. In step 15 (resist processing), a photosensitive agent is applied to the wafer. In step 16 (exposure), the above-mentioned exposure apparatus bakes and exposes the circuit pattern of a mask on the wafer. In step 17 (developing), the exposed wafer is developed. In step 18 (etching), the resist is etched except for the developed resist image. In step 19 (resist removal), an unnecessary resist after etching is removed. These steps are repeated to form multiple circuit patterns on the wafer. A

manufacturing apparatus used in each step undergoes maintenance by the remote maintenance system, which prevents trouble in advance. Even if trouble occurs, the manufacturing apparatus can be quickly recovered. The productivity of the semiconductor device can be increased in comparison with the prior art. --

Please substitute the paragraph beginning at page 59, line 21, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- In one aspect, the exposure apparatus of the present invention can suppress deformation of a chamber upon reducing the internal pressure of the chamber having an optical element. --

Please substitute the paragraph beginning at page 59, line 25, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- In another aspect, the exposure apparatus of the present invention can keep the purity of inert gas in the chamber high. --

Please delete the paragraph beginning at page 60, line 1, in its entirety. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.